

Increased Behavior Problems Associated With Delayed School Entry and Delayed School Progress

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ABSTRACT. *Objective.* To investigate whether students who are old-for-grade have higher rates of reported behavior problems and to investigate whether this association is independent of having been retained a grade in school.

Methods. Cross-sectional analyses of parental reports from the nationally representative sample of 9079 children ages 7 to 17 years who participated in the Child Health Supplement to the 1988 National Health Interview Survey. Students older than the modal age for their grade were considered old-for-grade, either due to delayed school entry (those without grade retention) or to delayed school progress (with history of grade retention). Behavior problems were defined as scores >90th percentile on a well-utilized, standardized Behavior Problem Index (BPI).

Results. Twenty-six percent of 7- to 17-year-old children in the United States are old-for-grade. Being old-for-grade is more common in males (31%), blacks (33%), Hispanics (32%), those living in single-parent households (31%) or poverty (43%), and those with mothers with low educational attainment (42%). Most children (84%) who repeated a grade are old-for-grade, but only 54% of old-for-grade students have been retained. For children who were old-for-grade, 19% of those grade-retained and 12% of those nonretained had extreme BPI scores, and for those not old-for-grade, 17% of grade-retained and 7% of nonretained children had extreme BPI scores. Although rates of extreme BPI scores were consistently lower for children who were neither old-for-grade nor grade-retained, and consistently higher for those with both, these rates increased with age for children who were old-for-grade without being retained. Controlling for multiple potential confounders with logistic regression, both old-for-grade status and grade retention are independently associated with increased rates of behavior problems. Separate logistic regression analyses for blacks and whites showed that these findings pertained only to white children.

Conclusions. Whereas grade retention is associated with increased rates of behavior problems in children and adolescents, simply being older than others in one's class, without having experienced grade retention, is also associated with increased rates of behavior problems, most noticeably among adolescents. These data suggest that there may be latent adverse behavioral outcomes that result from delaying children's school entry.

Pediatrics 1997;100:654-661; behavior problems, educational status, grade retention, school readiness.

ABBREVIATIONS. BPI, Behavior Problem Index; OR, odds ratio.

Decisions regarding the age that children enter school rely largely on anecdotal reports. Data that exist to guide decisions are limited by either short follow-up or small sample size.¹⁻⁶ Although some studies have found increased rates of academic and developmental hazards among the youngest in the class as compared with the oldest,^{1,6} others have found little long-term differences by the third and fourth grades.²⁻⁵ Parents and educators must choose whether to hold back children whose birthdays are near the age cutoff that would otherwise place them among the youngest in their class. Although health, academic, and social benefits of early educational (preschool) experiences for youth have been demonstrated,^{7,8} it is unknown whether children gain any long-term advantage by being older than the majority of their classmates.

There are some data to suggest that adolescents who are older than the majority of their classmates (old-for-grade) are more likely than those who are the same age as their classroom peers to smoke, drink, and use drugs,⁹⁻¹⁰ to engage in high-risk sexual activities,¹⁰ to have suicidal intentions,¹⁰ and to engage in violent behaviors.¹⁰ These studies have not distinguished the reason why the adolescents were old-for-grade. Many are old-for-grade by virtue of having been retained a grade or more in school; others were held back because they were deemed intellectually or emotionally delayed and thus not ready for school. Some take 2 years to transition from kindergarten (in transitional prefirst grade programs), and others were held back in attempts to provide an intellectual or physical advantage of an extra year. The independent association of being old-for-grade and grade retention with adolescent behaviors of concern is of importance, as it may help elucidate antecedents of adolescent mental health problems or risk behaviors and help identify strategies for prevention and intervention.

Since 1970, the proportion of students in the United States ages 6 to 8 years who are older than their same grade peers has doubled, from 11% in 1971 to a peak of 22% in 1990 to 18.7% more recently in 1993.¹¹ The proportion of adolescent students who are old-for-grade also has increased during the last 2 decades from 22.5% in 1971 to 32% in 1993. Males,

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Received for publication Oct 17, 1996; accepted Mar 13, 1997.

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PEDIATRICS (ISSN 0031 4005). Copyright © 1997 by the American Academy of Pediatrics.

minorities, and children for whom English is a second language are disproportionately older than their same-grade peers.¹² In most cases, old-for-grade status is largely determined by third grade. Very few programs exist that focus attention on accelerating remediation;¹³ thus, once children are old-for-grade, they rarely catch up to their same age peers.

There are few data to suggest why these trends exist and what impact this may have on adolescent behaviors. This article presents the results of analyses of nationally representative data to investigate whether being old-for-grade is associated with increased rates of behavior problems, and if so, to determine when during childhood and adolescence the behavior problems increase and to test whether this association is independent of having been retained a grade or more in school.

METHODS

Data from the 1988 Child Health Supplement to the National Health Interview Survey¹⁴ were analyzed for this study. These data represent the most recently collected, complete child health supplement to the National Health Interview Survey. The complex, multistage probability sampling design provides data on a nationally representative sample of 17 110 children and youth ages 0 to 17 years. Parents, predominately mothers (80%), responded for their children. There were no medical examinations of children or review of medical records. The overall response rate for the child health supplement was 91%.

Analyses were confined to children ages 7 to 17 years, thereby limiting the sample to children who were old enough to have attended school for at least 1 year. Responses for 9131 children met this age criterion, but missing data reduced the sample studied by less than a percent to 9079 children. The variables investigated included demographic characteristics, such as age, gender, and race; family structure, mobility, and poverty status; maternal age at the birth of the sample child; current maternal educational level and employment status; and selected child health information (reported health status, birth weight, and exposure to cigarette smoke). Racial comparisons were limited to black versus white, using the variables as recoded by the National Center for Health Statistics.¹⁴ White included Spanish origin persons unless they were definitely black, Indian, or other nonwhite; black included African-American, Afro-American, Haitian, Jamaican, West Indian, and so on; other included other than black or white, such as Japanese, Chinese, American Indian, Korean, and Eskimo.

The primary independent variables of interest were age-for-grade and grade retention. Old-for-grade status was based on children's birth dates, dates of interview, and reported grade levels. Students older than the modal age for their grade were considered old-for-grade. The modal ages for 3rd, 6th, 9th, and 12th grades based on national data are 8, 11, 14, and 17 years, respectively, using a cutoff of October 1. Actual cutoff dates for school entry vary by school system, and children whose birthdays are near the cutoff date will be among either the oldest or the youngest in their class, but at least 12 months separate students who are old-for-grade from those who might be considered young-for-grade.

Grade retention was assessed by parental report. Parents were asked whether their child had repeated any grades, and if so which ones. Old-for-grade students who had a history of grade retention were considered to have delayed school progress, whereas old-for-grade students without such history were considered to have had delayed school entry.

The primary outcome studied was parentally reported behavior problems, using a standardized 32-item, parent-reported Behavior Problem Index (BPI), developed by Zill^{15,16} for children 4 years and older. Most BPI items were modeled after items from the Child Behavior Checklist of Achenbach and Edelbrock¹⁷ and were chosen because of their reliability and adaptability to the interview situation. Parents were asked whether each behavior is often true, sometimes true, or not true of their child, for each of the behaviors listed in the Appendix. These behaviors included the

following: "has sudden change in mood or feelings," "feels or complains that no one loves him/her," "cheats or tells lies," "has a very strong temper and loses it easily," and "cries too much." The scoring system, as previously described, coded each item as either 1 if the parent responded often true or sometimes true or as 0 if not true. BPI scores were tallied by adding the 1 or 0 for each response, and the total was compared with the 90th percentile for age, a cutoff that has been associated in other studies with an increase in mental health referrals.¹⁸ The BPI has been used in a number of previous studies as a measure of significant behavioral problems.¹⁹⁻²⁴

Statistical Analyses

Analyses using SUDAAN (Research Triangle Institute, Research Triangle Park, NC) software permitted precise estimations of confidence intervals that account for the complex, two-staged design of the survey.²⁵ χ^2 tests were used to test for differences in weighted proportions.²⁶ To estimate the independent association that various combinations of old-for-grade status and grade retention have with extreme BPI scores, logistic regression analyses were done to control for potentially confounding factors: age, gender, race, Hispanic ethnicity, poverty status, maternal age and education, family structure, urban status, region of country, mobility since birth, low birth weight status, and household exposure to cigarette smoke. Additional logistic regression models were constructed to assess whether the associations of behavior problems with old-for-grade status and grade retention vary by race or by age group. All analyses were conducted on an IBM-compatible PC.

RESULTS

In this nationally representative cross-sectional sample of children ages 7 to 17 years, 26% were old-for-grade, approximately one half of whom had been retained a grade in school (14%) and the other half of whom had not (12%). The majority of children (71%) were neither retained nor old-for-grade, and a small proportion (3%) had been retained without becoming old-for-grade. Table 1 displays the estimated prevalence of old-for-grade and grade retention by selected demographic, health, and behavioral characteristics. Males were more likely than females and black youth more likely than white youth to be old-for-grade, largely attributable to increased rates of grade retention. Hispanic children were more likely to be old-for-grade than non-Hispanic children despite similar rates of grade retention. Additionally, old-for-grade with grade retention varied by region, family structure, maternal age at birth of the child, number of times that the family had moved, parent-reported child health status, birth weight, household tobacco exposure, extreme score on the BPI, and rank in school. Being old-for-grade with and without retention was more common among children living in poverty and among children with less educated mothers.

Old-for-grade children who have no history of grade retention were on average 11.4 months older than their same grade peers (who were neither retained nor old-for-grade); whereas, old-for-grade children who had been retained were on average 14.3 months older than those neither retained or old-for-grade. ($P < .001$ for the comparison between the old-for-grade groups—results not shown in Tables.) Fourteen percent of the latter retained old-for-grade group were retained more than once. A small number of children (2.7%) have a history of having been retained in school, but were not old-for-grade; these children were on average 2.3 months older than their same grade peers.

TABLE 1. Estimated Prevalence of Old-for-Grade and Grade-Retained United States Children, Ages 7 to 17 Years, by Selected Characteristics (n = 0.079) (Child Health Supplement to the 1988 National Health Interview Survey)

	% Old-for-Grade		% Not Old-for-Grade	
	Grade-Retained	Not Retained	Grade-Retained	Not Retained
Overall	14%	12%	3%	71%
Selected demographic characteristics				
Gender				
Male	18*	13*	3	66*
Female	10*	11*	2	77*
Age				
7 y	4*	10	3	83*
8 y	10*	14	3	73
9 y	14	13	2	71
10 y	13	12	2	73
11 y	16	11	2	71
12 y	16	11	2	71
13 y	17*	13	3	67*
14 y	15	10	5*	70
15 y	17	12	3	68
16 y	17	12	3	68
17 y	15	13	2	70
Race				
Black	21*	12	5*	62*
White	13*	12	2*	73*
Other	10*	16	2	72
Hispanic ethnicity	14	18*	4	64*
Region				
Northeast	11*	9*	3	77*
Midwest	13	14*	1*	72
South	18*	12	3	67*
West	11*	13	3	73
Urban status				
Urban (central city of an MSA)	15	13	3*	69*
Nonurban	14	11	2*	73*
Poverty status				
Below property ($\geq 100\%$ poverty index)	25*	18*	4	53*
Above poverty ($> 100\%$ poverty index)	12*	11*	2	75*
Parent household composition				
1-Parent household	19*	12	4*	65*
2-Parent household	12*	12	2*	74*
Maternal education				
Less than high school education	24*	18*	4*	54*
High school graduate and/or some college	12*	10*	3	75*
College graduate	5*	11	2*	82*
Maternal age at birth of child				
< 17 years old	25*	14	2	59*
≥ 17 years old	13*	12	3	72*
Mobility (number of moves since birth)				
0 moves	9*	12	2	77*
1 move	11*	12	2	75*
2 or more moves	16*	12	3	69*
Selected health characteristics				
Health status reported as fair or poor	24*	14	2	60*
Low birth weight (< 2500 grams)	19*	15	4	62*
Very low birth weight (< 1500 grams)	24	13	1*	62
Smoking in home since birth of child	17*	12	3	68*
Smoking in home currently	18*	13*	3	66*
Behavioral and educational characteristics				
BPI > 90 th percentile	28*	14	5*	53*
School rank				
One of the best/above middle	6*	11	1*	82*
Middle	21*	13	4*	62*
Below middle/near bottom	38*	11	7*	44*
Repeated grade	84*	0*	16*	0*
Old-for-grade	54*	46*	0*	0*

* $P < .05$ for comparison of proportions of the selected characteristics versus without that characteristic for each category of old-for-grade and not old-for-grade youth.

To permit age-specific comparisons on the basis by which children become old-for-grade, the proportion of children who were old-for-grade are plotted for each year of age by grade retention status in Fig 1.

Age-specific comparisons of grade level at retention are made in Fig 2. At every age level, approximately 10 to 15% of children were old-for-grade without having been retained in school. The majority of old-

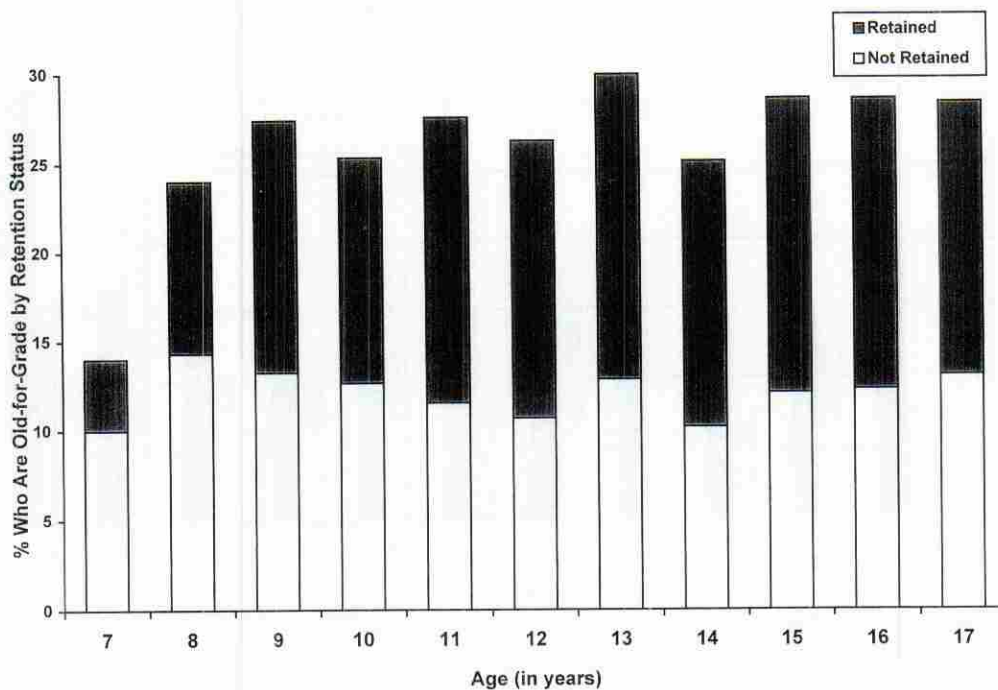


Fig 1. Proportion of children, by age, who are old-for-grade by history of grade retention (n = 9079) (Child Health Supplement to the 1988 National Health Interview Survey).

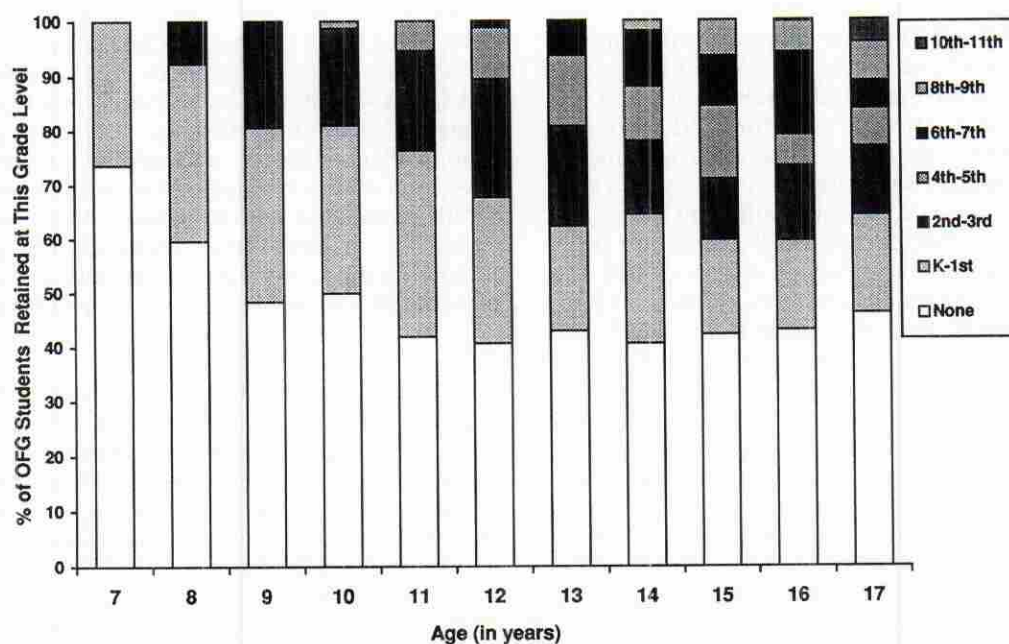


Fig 2. Grade level at retention of children who are old-for-grade by age (n = 2265) (Child Health Supplement to the 1988 National Health Interview Survey).

for-grade, had been either delayed entry to school or retained a grade level by third grade, as seen in Fig 2. Among old-for-grade 17-year-old children, 77% were old-for-grade by third grade.

Comparing rates of extreme BPI scores with various combinations of old-for-grade and grade retention status reveals that both factors are associated with increased rates of reported behavior problems. Old-for-grade children who had been retained a grade or more had the highest rate of reported extreme BPI scores (19%); those who were old-for-

grade without retention had a rate of 12%; of those who were not old-for-grade, children without a history of grade retention had the lowest rate of extreme BPI scores (7%), whereas children who had been retained had a rate of 17% ($P < .001$ for these comparisons that are not shown in the Figures or Tables). Figure 3 shows the rate of extreme BPI scores by age for groups based on old-for-grade and grade retention status. Children who are neither old-for-grade nor grade-retained have lower rates of elevated BPI scores that are consistently lower across all age

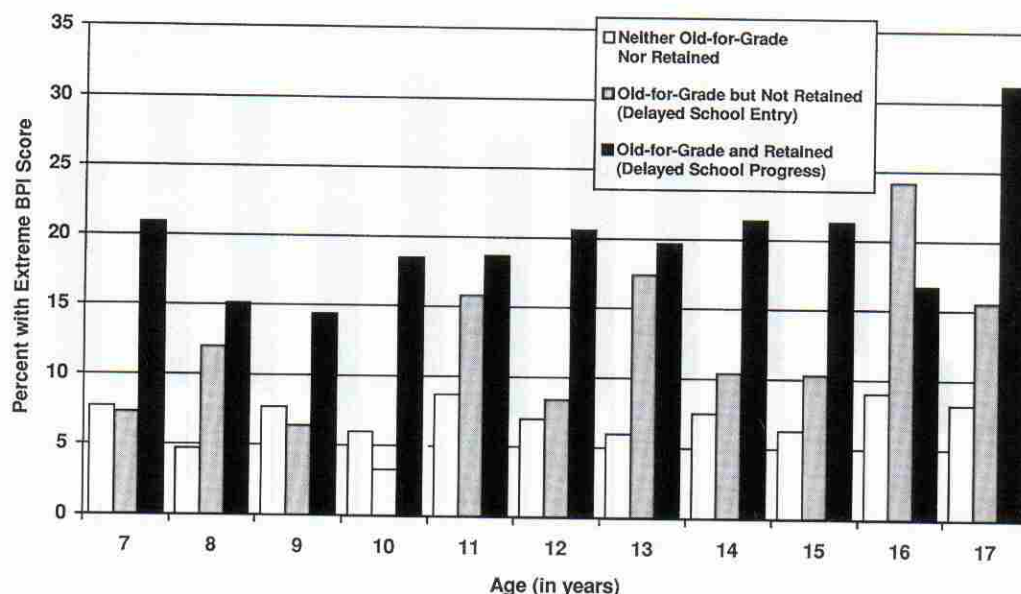


Fig 3. Age-specific rates of extreme Behavior Problem Index (BPI) scores by old-for-grade and grade retention status ($n = 9079$) (Child Health Supplement to the 1988 National Health Interview Survey).

groups. Children who are both old-for-grade and grade-retained have uniformly high rates of elevated BPI scores (more than twice the rate of the lowest risk group). Children who are old-for-grade without having been retained have a rate of elevated BPI scores that increases with age, with rates similar to the lowest-risk group (neither old-for-grade nor retained) when they are younger and approaching the rate for the highest-risk group (old-for-grade youth who had been retained) in the adolescent years.

Table 2 shows that extreme BPI scores are independently associated with being old-for-grade and having experienced grade retention [odds ratio (OR) = 2.5], with grade retention alone (OR = 2.2), and with being old-for-grade without having been retained (OR = 1.5), controlling for multiple potentially confounding factors ($P < .01$ for each of these three independent associations). Logistic regression analyses conducted for each of three age categories (7 to 10 years, 11 to 13 years, and 14 to 17 years) revealed that old-for-grade without grade retention was independently associated with extreme BPI scores only in the oldest age category, whereas the combination of old-for-grade and grade retention consistently was independently associated with extreme BPI scores in all age groups (not shown in

Tables). These findings are consistent with the findings of the bivariate analyses illustrated in Fig 3.

Logistic regression analyses were conducted separately for black and white children and adolescents to test for racial differences in the association of old-for-grade status and grade retention with increased behavior problems. Table 3 shows that among black children and adolescents, neither old-for-grade status nor grade retention were independently associated with increased rates of extreme BPI scores. In contrast, these factors, either separately or in combination, were independently associated with extreme BPI scores among white children.

CONCLUSIONS

"At what age should children start first grade?" is a question that can have a lifelong impact on a child. This study suggests that being older than the majority of one's classmates can adversely affect children's behavior and that this effect is independent of having been retained a grade in school. These findings pertain only to white children, as neither old-for-grade status nor grade retention were independently associated with increased reported behavior problems in black children. Furthermore, the emergence of behavior problems among those who are old-for-grade

TABLE 2. Independent Associations of Old-for-Grade Status and Grade Retention With Extreme Behavior Problem Index Scores ($n = 9079$)* (Child Health Supplement to the 1988 National Health Interview Survey)

	β	SE β	P Value	Odds Ratio	-95% Confidence Interval	+95% Confidence Interval
Old-for-grade and grade retention status						
Old-for-grade/retained	0.902	0.113	<.001	2.5	2.0	3.1
Old-for-grade/not retained	0.414	0.151	.007	1.5	1.1	2.0
Not old-for-grade/retained	0.801	0.238	<.001	2.2	1.4	3.6
Not old-for-grade/not retained	0.000	0.000		1.0		

* Independent associations are controlled for race, ethnicity, gender, age, poverty status, maternal education, family structure, maternal age at the child's birth, urban status, region of the country, reported health status, number of moves since birth, low birth weight status, and household exposure to tobacco smoke.

TABLE 3. Racial Comparison of Independent Associations of Old-for-Grade Status and Grade Retention With Extreme Behavior Problem Index Scores (n = 9079)* (Child Health Supplement to the 1988 National Health Interview Survey)

	White Children			Black Children		
	β	SE β	P Value	β	SE β	P Value
Old-for-grade and grade retention status						
Old-for-grade/retained	1.090	0.135	<.001	0.308	0.274	.26
Old-for-grade/not retained	0.448	0.157	.005	-0.102	0.327	.76
Not old-for-grade/retained	0.883	0.299	.004	0.641	0.377	.09
Not old-for-grade/not retained	0.000			0.000		

* In both of these analyses (for white children and for black children), independent associations are controlled for ethnicity, gender, age, poverty status, maternal education, family structure, maternal age at the child's birth, urban status, region of the country, reported health status, number of moves since birth, low birth weight status, and household exposure to tobacco smoke.

without having experienced grade retention seems to be concentrated among adolescents.

Timing of school entry is an emotionally charged issue for which there are minimal data to support various decisions that parents and school systems must make. Often, these decisions are based on a desire to give certain groups of children the advantage of an extra year of maturity before having to compete with others. Earlier studies have shown that adolescents who are old-for-grade, irrespective of grade retention, have higher rates of adolescent risk behaviors.^{9,10} This study shows an independent association of old-for-grade status with extreme scores on the BPI, a standardized measure of behavior problems, among adolescents. Extreme BPI scores, as determined by maternal report, are highly correlated with adolescents' self-reported emotional distress, social-deviance, and health-risk behaviors.²⁷ Thus, the elevated rates of extreme BPI scores noted in old-for-grade adolescents are likely to be independently associated with problems in other domains of competency. These data suggest that there may be latent disadvantages for children who are older than the rest of their classmates, disadvantages that are realized during high school, well after the decisions regarding timing of school entry were made.

The limitations of this study warrant some discussion. As a retrospective and cross-sectional study, the temporal relationships inferred by increasing rates of extreme BPI scores with increasing age may be attributable instead to a cohort effect; this supposes that being old-for-grade was a risk factor in the past affecting only the older children and that for the younger children, it is not a factor. There is no evidence to support this possibility; however, a longitudinal study would be necessary to fully establish that a temporal relationship does exist. This study is further limited by the measurable outcomes available in the source data. The outcome of parentally reported behavior problems scored by the BPI may reflect racial or cultural biases toward acceptable behavior.²⁸ Although the BPI is correlated with other measures of competency, the limitations of data preclude us from directly investigating the association of old-for-grade status with adolescent reported behaviors or with other measures of competency. These are questions for further study. This study, however, shows that from at least one perspective (parental perception of behavior), children who are older

than their peers are more likely to have behavior problems.

Although old-for-grade status was shown to be an independent risk factor for increased rates of behavior problems, one cannot conclude that all old-for-grade children would have done better if they began school with their same-age peers. The finding that neither old-for-grade status nor having been retained a grade in school was independently associated with increased rates of behavior problems among black children and adolescents was unexpected. Black children, who on average face more environmental and social adversity than do white children, did not have increased rates of parentally reported behavior problems associated either with being old-for-grade or with grade retention. In other studies of risk factors, the number of risk factors present in a child's or youth's life has been shown to increase the likelihood of adverse outcomes;²⁹⁻³¹ thus, one might expect the association of old-for-grade status and behavior problems to be stronger for black (than white) children and adolescents. Although this lack of association may be attributable to differential parental reporting of behavior,²⁸ the explanation may be that other factors, such as poverty and family structure, are more strongly associated with reported behavior problems, as was shown in an earlier study of predictors of early grade failure.²⁰

How might being older than one's classmates confer risk to an adolescent? One possible explanation might be that peer relationship formation may be altered by differences in the child's age compared with his or her same grade peers. Biologic maturation (eg, puberty) occurs in earlier grades among students who are old-for-grade, and this may affect peer networks and self-concept and ultimately affect psychosocial functioning of adolescents.³² For some, delaying school entry may also delay detection and treatment of previously undiagnosed developmental delays or learning disabilities.³³ Such delays may predispose children to later problems.

Understanding the mechanism for such associations is important for devising intervention strategies. Old-for-grade adolescents, whether by delayed school entry or delayed school progress, are shown in this study to have higher rates of behavior problems as reported by their parents and have been shown in previous studies^{9,10} to have higher rates of risky behaviors, including drug use. Given the long

lead time between becoming old-for-grade, and the subsequent increase in adolescent risk behaviors, old-for-grade youth may be the population to target with primary and secondary prevention strategies before their behavior problems spill over to other domains. Focus on behavior problems before the development of youth risk behaviors may be one avenue worth exploring with children who become old-for-grade.

One logical response to these findings by health care providers is to focus on school readiness as part of well-child visits. Children in the United States, on average, see their health care providers 2 to 3 times a year;^{34,35} young children see them more often, resulting in approximately 12 to 15 opportunities for assessment and intervention. Often, pediatric health care providers are the only professionals consistently assessing preschoolers' progress throughout multiple stages of early development and are often the only professionals in a position to intervene to improve school readiness. There are many points of intervention before school entry that a health care provider may initiate, from promotion of early literacy,^{36,37} to early intervention,^{38,39} to facilitation of enrollment in Head Start.⁴⁰

The findings of this study may have relevance to pediatricians in assessing school readiness of preschoolers, in offering parents advice about age of school entry, and in monitoring the development of school-aged youth. In all of these activities, pediatricians may wish to include the major finding of the study, namely, that delaying school entry seems to have inadvertent latent adverse behavioral consequences for children and adolescents who are old-for-grade.

APPENDIX

Questions Asked in the Behavior Problem Index^{§14}

1. Has sudden changes in mood or feeling.
2. Feels or complains that no one loves {child's name}.
3. Is rather high-strung, tense, or nervous.
4. Cheats or tells lies.
5. Is too fearful or anxious.
6. Argues too much.
7. Has difficulty concentrating, cannot pay attention for long.
8. Is easily confused, seems to be in a fog.
9. Bullies, or is cruel or mean to others.
10. Is disobedient at home.
11. Is disobedient at school.
12. Does not feel sorry after {child's name} misbehaves.
13. Has trouble getting along with other children.
14. Has trouble getting along with teachers.
15. Is impulsive, or acts without thinking.
16. Feels worthless or inferior.
17. Is not liked by other children.
18. Has a lot of difficulty getting {child's name} mind off certain thoughts, has obsessions.
19. Is restless or overly active, cannot sit still.
20. Is stubborn, sullen, or irritable.
21. Has a very strong temper and loses it easily.
22. Is unhappy, sad, or depressed.
23. Is withdrawn, does not get involved with others.

If child is 12+ years old, go to 29.

24. Breaks things on purpose, deliberately destroys {child's name} own or other's things.
25. Clings to adults.
26. Cries too much.

27. Demands a lot of attention.
28. Is too dependent on others.

If child is under 12 years old, stop.

29. Feel others out to get {child's name}.
30. Hangs around with kids who get into trouble.
31. Is secretive, keeps things to himself/herself.
32. Worries too much.

§The interviewer reads the following statement: "Now I am going to read some statements that describe the behavior of many children. Please tell me whether each statement has been OFTEN true, SOMETIMES true, or NOT true of {child's name} during the past 3 months."

"The first statement is: 'Has sudden changes in mood or feelings.' Has that been OFTEN true, SOMETIMES true, or NOT true of {child's name} during the past 3 months?"

The interviewer records the response and continues with statement 2.

The interviewer reads the list repeating categories and/or time reference as needed.

ACKNOWLEDGMENT

We thank Sharon M. Carver, PhD, for reviewing this manuscript.

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